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METHOD, APPARATUS AND PROGRAM TO MAKE PAYMENT IN ANY CURRENCIES THROUGH A COMMUNICATION NETWORK SYSTEM

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(57) Claim

Title of Invention

Method, apparatus and program to make payment
5 in any currencies through a communication
network system.

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Background of Invention

This invention advantageously relates to a method, apparatus and program to make payment in any currencies through a communication network such as a telephone service or data service such as the Internet. This invention
 5 relates generally to a telephone payment service in lieu of banking services such as electronic fund transfer and more particularly to a pre-paid card system having a remote terminal such as a phone or data input terminal and host computer with a database for accounts for verification of these cards in pre-paid
 10 amounts, transaction codes, payment codes, receipts codes and their respective user/owners.

Background Art

The present invention relates to the field of applying pre-paid cards and the option of converting to any currencies for electronic payment through a telephone service or by using a data network. Banks already have facilities such as "Phone Banking" which uses a bank centric network system to do
 15 transactions provided one has an account with the bank and money available or with either credit/debit card. Unlike this invention, a debit or credit card is not anonymous. The main difference here is that a prepaid card has anonymity, fixed amount and security over the telephone line or Internet as the case maybe. Moreover, the "actual payment" has already been completed securely with the originator/maker or representative of these pre-paid cards and the transaction
 20 payment is merely an electronic order to the maker of these cards to transfer the money to the merchant of choice as stipulated by the user. The case here is that "actual payment" is a physical process and the manufacturer or provider of this service carry equal risk of paying to the wrong party should this system fails. The user has little risk since two codes (one from user and one from merchant)
 25 are required to initiate a payment and they have to match. If the merchant of choice has an account within this invention, this in most case is merely an electronic book entry. Withdrawal of actual money can be accomplished by transferring funds electronically or by cheque payment through regular banking system.

The choice of credit/debit cards is also limited by the service only available to merchants. There are many merchants who do not accept such facilities particular given the rising charges. This system also enables users to make payment to non-merchants by transferring the funds directly into the non-merchant accounts. A final point is that this system is instantaneous and there is
 35 no waiting period like in a cheque system since all the money is already pre-paid. There is also no exorbitant interest rate as per credit cards facilities. There is no interest for money while stored in the pre-paid card.
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Another problem with credit cards in electronic commerce is that it is costly to charge for any amount less than USD 5, which makes "micro-payment" problematic. It is envisaged that micro-payment system, that is charging customers USD 1 to 2 to view documents or information (at least as cost effective as a physical magazine or newspaper) is the future to many of the information service organisations.

At the policy level, credit cards seem to disadvantage merchants as well, since if there is any disputes and where the merchant cannot evidenced a signature, then the bank providing the service will simply favour the client and deduct the amount from the merchant accordingly. While this may be a policy issue between the credit provider and merchant, most merchants will probably maintain a contingent risk fee if the customer is going to charge by a credit card over the Internet to cover the risk of not receiving funds in the event of a dispute.

The current invention is useful because it employed a prepaid mode, hence money will be transferred to merchant accounts. In this Invention, the only middleman is actually a computer that requires physical input from the client. In the case of a credit/debit card, the card sponsors actually pay the merchant first (hence the credit proposition) and charged the full amount with interest to the client. The credit card allows the client to borrow up to a certain amount. The debit card is similar except the policy is to allow the client to spend up to a certain amount within a certain time and to paid in full the amount at the end of the month. Credit Card Company usually earns the bulk in interest plus principal from their clients while debit card providers earn the bulk from their merchants in terms of fees. However, it should be noted that this difference is not so significant anymore as more and more strategic partnerships are being forged. Therefore unlike credit/debit cards where the minimum base cost is the cost of money over the period to billing, we actually receive money in trust first before paying to another so there are no holding and no default risk cost. Rather we are receiving interest from money in trust.

At the outset, the main problem is how to deposit money in or to convert cash into electronic cash or to digitise it into accounts when there is no banking facility around. For example, to appreciate Phone Banking, one has to open an account with a bank first. Unfortunately, banks are closing doors. This is a persistent problem plaguing isolated areas, which may only have telecommunications facilities but no banks or rather banks find it most costly to operate a physical branch where it is not profitable when the main thrust of business being local merchant transactions only. With rising banking service fees and depositing requirements, marginalised communities may miss out on new challenges such as the fee based information from Internet by simply not able to take part in the transaction side of Electronic Commerce.

Alternatively, the same situation may be faced by Electronic Commerce if there is no physical bank to convert real cash into electronic cash for payment. Some people loathe the idea that the world payment system will eventually be cashless and would prefer maintaining a cross between the two systems. The

main excuse is privacy, which is matter of preference. This invention stands in as a solution.

Electronic Commerce means dealing with International Businesses, a need to convert instantly to a foreign currency is paramount as well as the need for secure technology. The problem with security on the Internet is one of interest. From my recent research, it is shown that the majority of consumers continue to distrust the high-level security hype involved in Internet transactions used to send sensitive information such as one's credit card number. This may be significant since certain high-level security technologies are not easily understood and psychological, we tend to distrust things that we do not understand. Secondly, there are a number of intelligent checking systems employed by Credit Company to detect fraud. Unfortunately the problem with this system is that it might accidentally or by design block a legitimate transaction arising from some dispute in the past. What this means is that if there was any dispute even an innocent one, the card will be blocked forever, resulting in a bad credit report on the user. The credit card industry is very sensitive to Internet Fraud that they are not taking any risks.

By conforming to appreciated methods, this invention solves the perceived insecurity by carrying the last leg of payment through a telephone network on one to one basis with the host computer and by reversing the roles of merchant to providing payment codes instead of receiving credit card's numbers. Secondly, we also do away with static numbers, so while interception is still possible at this stage but effectively discourage since the data here refers to dynamic payment codes rather than static financial data. The interceptor will need further effort to break down the codes and even if that is successful, it is only one part of the payment process which requires a matching code (under this invention) to execute the payment sequence which is then linked to the actual instrument of payment ie the pre-paid card account. As a further discouragement, each pre-paid card is limited in value to \$100 only and hence limit any potential liability to the same amount. If the Internet is being used, this invention has only one Internet gateway for those who might otherwise prefer transferring financial information through the Internet. This is different from a credit/debit card facility where merchants have payment servers built into their sites linking to the Gateway. It is my belief that security breaches happen because of the many gateways or windows in-between the payment servers and intermediaries. In short breaches happen because of the many links between the card acceptor to the payer. In this invention, the merchants have no access to the financial information and in turn, they must generate/sent a payment code instead of receiving financial information. One set of these codes is sent by the merchant system to the buyer in the form of an encrypted email and another to the host computer. For anonymous payment, on receiving this code, the buyer has to log onto the World-Wide-Web site of this Invention (the host computer) to input this code which usually has a timed life. This code will be analysed and matched to the merchant's code and the details of the purchase will be shown for verification. Alternative if he/she has an account or call a special number

and follow the instructions to complete the purchase. The buyer will then log on with his passwords. Now if the host computer was able to decrypted the code sent earlier by the merchant computer system, then it would display the payment request in the account of the buyer. The buyer will need to add the code he had earlier received into his account to complete the purchase. The host computer will verify both codes and make the proper payment. The most interesting feature here is that no information is ever allow to be transmitted out from the host computer. Even the email is intercepted, the code is encrypted and of little use. Up to the point where the codes are physically inputted back using computer keyboard or telephone pad and transmitted to the host computer, it has no value at all. For account users, a safety feature here is that only buyers can logon to complete the transaction as the password, computer IP address and telephone number are recorded as well. Another difference with other payment scheme is that the merchant has to actually initiate the transaction first when an invitation has been accepted. This is important since, unlike credit card transactions, the merchant cannot accept any codes and instead has to send codes itself to finalise the transaction. This reversal means, evidence of actual purchase is put into the hands of the buyer since the buyer has to deal with the host computer which makes it easy to establish relationship later.

In contrast with a credit/debit card where one credit cards number is fixed for life and it is possible for crackers to break the code and gain access to ones' credit card number or by a means of computer program to second "guess" the credit card number, this invention provides random but verifiable codes for different payments each time. These codes have a life time of usually up to 24 hours.

To process Internet payment, the transaction might involve using a foreign currency. The concept of converting one currency to another is not new, banks, money changers and so on provide this service on a daily basis. When one purchase a pre-paid card in one local currency, one can use it to pay for services denominated in that currency but if it is a service denominated in another currency, then one need to convert it to that currency first. While a credit/debit card facility can provide such a service it is often 'settled' at the rate that the provider of the service consider the most advantages leaving much guesswork by the user of these facilities. In this invention, the user is prompted to the exact foreign currency exchange rate prevailing at that time of initialising the transaction. The user will know exactly how much the conversion rate is and the final amount at that time rather than when the bill arrives. It is then his prerogative to accept or reject this rate and amount. Such prerogative is absent with the use of a credit/debit card. With volatile exchange rate movements, this can be costly.

As mentioned, the spirit of this invention was primarily to find a solution to the problem of banking inactivity in certain communities for various reasons. It is also envisaged that this present invention will be used by local residents who do not have a credit/debit card, checking or savings account with a local bank (either because there is no local bank at their area or it is too far), but

nevertheless need to pay some bills and have access to a public/private telephone and/or Internet Access. To economically sustain this invention, 1 to 2 percent revenue can be generated by charging a fee collected when customers pay bills for utilities, such as telephone, electric, gas, and water, as well as other bills, such as cable, television or even credit card bills. Advertising which is played at intervals is another avenue. The system described here operates under contract with the local utilities and companies to provide such a payment service.

It is noted that "money" in the system is stored in two formats. The first being "floating" that is represented by the pre-paid card and the second is "stored" that is when money represented by the pre-paid card has been electronically deposited into the user's account in the host computer. Once money is stored in the user's account, the devising pre-paid card is of no value. Payment can be made at any time using the user account. Payment made from a "floating" position will be anonymous. There is a cost to store digital money in the user's account, which is reflected through several variables presented in a "store-value" formula. The final stage is when the "money" leaves the payment system through a deactivation process and/or by cashing out. There is also a cost associated to deactivating the pre-paid card (if it still represent some money) or electronic money in the account through cash out. Hence in summary, this invention provides a possible solution to combine both on-line and off-line payment opportunities within the same system. Depending on desirability, it also preserves anonymity of the user just like physical money.

This invention is designed for low cost maintenance, high usage and applying available technology with the exception of its decrypting and verifying algorithm in generating purchase codes for its customers and matching code for the vendors. It is targeted at low-income society, which has special needs such as safety features, low cost and almost theft proof. For example when the user purchases these pre-paid cards, a receipt will be issued to them. This receipt contains the details of the pre-paid card such as the serial number, value and time but not the security features, which are stored on the card directly under some scratch-off material. On each card, there are two sets of peel-able bar codes where the user can keep one set for record. The seller need to peel and keep the other set at the point of sale to be recorded in the daily sale record. At the end of the day, the daily sale record is faxed to the manufacturer of these pre-paid cards. Since they contain only bar-readable codes, they will be scanned immediately and information uploaded to the host computer. If these pre-paid cards are stolen then they can be traced quite easily using the above records and even if the owner lost them by accident, the owner can return to the vendor where he purchase these pre-paid cards to check the records to make a cancellation and a new card is provided. Alternatively, the rightful owner can deactivate these pre-paid cards through a request to the host computer since the serial number of the pre-paid card, value and time of purchase are known or at least traceable from the seller within a reasonable time frame. And because each card has a computer generated trial code, even if these cards have been 'use'

that is for some service, such payment will be put on hold. Furthermore, if the thief try to use the pre-paid cards through the network of telephones, the host computer will know from which phone the call was made and inform the authorities. If the thief tries to deposit the money stored in the pre-paid card into his own account, then his identity will be known as all pre-paid cards have a unique tracking number and all accounts in the host computer are linked to the identity of their owners. If the thief tries to deposit into another person's account the amount will be negated. There is nothing to prevent the thief from selling the pre-paid cards in the black market but if the card is suspect then the value of such pre-paid card is no more than the plastic/paper it is made from. It is also difficult to counterfeit since no two cards' identity is the same or in sequence. Separate programs are used to assign serial numbers (equivalent bar codes) and security codes with a third program randomly synchronising both numbers to one card. In short, this system is safer than real money since no one can steal or counterfeits them. It is traceable and recoverable. The program is designed as a double entry system where it must receive real money for it to issue a pre-paid card and vice-versa to close an entry. The system is not intended to replace the banking system but serves to supplement certain banking services where the bank no longer provides or regards it as unprofitable. Quite the contrary, banks are suited to be the external link to the system since they can be called on to make payment and receiving wire-transfer to and from this system. For this to be accommodated, back-end integration is required.

In the operation of the prior art system, pre-paid cards are mainly use for telephone services and are already well accepted in the community. The reason for this was mainly because of convenience, zero-administration and lower access fees. Such cards are typically purchased from vending machines or shop keepers and come in fixed value increments, for example, \$10, \$50. A \$10 card provides a customer with a certain number (eg 30) minutes of long distance time from any touch phone telephone to any location in the country or internationally. These cards are batch activated by the card provider in a limited number of predetermined values to make telephone calls. A customer purchases one of these pre-activated cards by paying a fee usually the face value of the card. Similarly, the card typically included a predetermined identification code and a special password code is obscured by a scratch off material. To use the card, the customer accesses the service (usually through an 800-number), enters the identification code (typically obtained from the back of the card), dials the destination number and the call begins. Prior to dialling, the system may inform the user of then-current card balance. If during a call the time remaining on the card is about to expire, the customer may be prompted (through a voice over) that only a certain amount of time remains. When the designated time has expired, the call is terminated. The result scenario is that there is no monthly bills, no surcharges, which fits into our original desire to reduce transaction costs by assuming there are no intermediaries/administration such as banks. It also serves our requirements for digitising cash since when one purchase a pre-paid card, one actually has exchange real cash for electronic cash or received

some perceived notional electronic credit in a computing system. And finally, there is no need for a bank to be selling these pre-paid cards.

5 In a preferred embodiment, a pre-paid card system enables customers to access a telephone network and obtain transaction services such as paying for water, gas, electricity or services other than making a phone-call. The system includes seven main functional components: a plurality of pre-paid cards, a host computer, a call processor, a programmable database containing unique customer's account numbers/pre-paid cards security tag, unique formulae to calculate the cost of stored value and a currency conversion utility with
10 matching interest rates and a security based algorithm to generate, encrypt and decrypt payment codes, serial codes, security codes.

Each of the pre-paid cards preferably includes a body portion and several security features such as security number imbedded under some scratch-off material. There shall be two sets of peel able standard readable barcode shown
15 on the card. The card is typically formed of plastic or cardboard. The main management and processing of the system is effected by the host computer, which is connected to the telephone network or over the Internet. The host includes a database for storing number accounts of individuals or corporations, these accounts include private passwords to enter the system, the account
20 balance of these accounts, the activation and security associated with the pre-paid cards, the security trials number for transaction after activation, payment codes and receipt codes. The call processor is controlled by the host computer for interfacing one of more customers to the telephone network using the authorised pre-paid cards. A different interface is through the World Wide Web
25 which is controlled by the host computer replicating the process of accepting payment request.

The system should also include a general accounting and billing information so that system operator can determine which point of sale operator has sold and deactivate a particular pre-paid card. This enables the system
30 operator to reconcile all transactions at the end of the day.

The below has outlined some of the more pertinent objects of the present invention. These objects should be construed to be merely illustrative of some of the more prominent features and applications of the invention. Applying the disclosed invention in a different manner or modifying the invention as will be
35 described below can attain many other beneficial results. Accordingly, referring to the following Detailed Description of the preferred embodiment may have other objects and a fuller understanding of the invention.

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Objects of Invention/Summary of Invention

The Inventor has developed a method of utilising a telecommunications system with a host computer which is linked to a public telephony system network and through the Internet where applicable. The system interface is linked to a call processor such as an "Interactive Voice Response system" and to the World Wide Web. The program for this system is written in Visual C plus plus language running on Windows NT Server. The heart is a database engine such as Microsoft SQL Server 7.0 or Oracle 8i. Included in the systems are Microsoft Exchange, IIS, SMTP and Index Server for Internet capabilities.

Thus according to one embodiment of the invention there is provided,

A call process system comprising:

Receiving an incoming request from a user through the public telephony System network via a modem or any connecting interface suitable and secured for this purpose,

Upon checking the calling number or IP address and recording with a time stamp,

Respond with the appropriate welcoming message or advertising messages,

Provide menu prompts to input either pre-paid card number or account number,

Upon receiving activation info and security info from user, host computer will authenticating the pre-paid cards by checking against the codes and authorising them as "floating" and menu prompt,

Upon receiving account number and password, provide account user with account balance information and menu prompt,

Inputting queries and wait for a response

Upon receiving payment code, decrypt the code to provide vendor's identity and amount,

Check whether pre-paid card or account has sufficient to pay

Provide advertising messages while it waits for a response from the user or computer, where advertising is audio for phone and visual for computer interface,

Prompted the user with the information provided

After inputting and registering the desired information either through the touch-tone method or direct voice method or keyboard, this will be then sent to the central controller inside the host computer for processing. The sending process is through a telephone line or network of on-line computers for the Internet. The central controller will process the information and sent a reply/response through the same way back to the user. The above process is repeated again until the user is satisfied with his results unless security features are present to prevent abuse.

10 It is an object of this invention to provide a pre-paid card system to pay both local/foreign services providers and receive funds by providing the method, apparatus and accounting program for transferring electronic credits into numbered accounts and into any currencies through a communication system in lieu of a banking facility.

15 It is yet another object of the present invention to provide a pre-paid card system where it can perform payments or receivable transactions in any currency by assigning each transaction a purchase code and executing the final payment process over a communication network.

20 It is still another object of the invention to provide a pre-paid card system wherein each authorised card has an enabling security code associated therewith for a host computer to track usage and for deactivation purposes.

It is still a further object of this invention to provide a pre-paid card system wherein the host computer maintains a database of authorised cards accounts, the database contains detailed information about where the card was sold, by whom, the amount that was sold, the time of the transaction, transactions made from this amount, updates this balance at the time of a transaction and present the status of each card in the system. The host computer will also maintain a database of user accounts, which are linked to the pre-paid cards with amounts being credited or debited in the system. These numbered accounts belong to either individuals or corporations and are duly authorised though a prior agreement between the pre-paid cards provider with the individuals or corporations.

30 The core of this invention is the availability of the accounting system which requires double entries to make it possible for transactions such as payment, be made from one individual to another. For this purpose, the accounts are simply defined as "stored". These accounts have predefined calculated stored value achieved by a formula. This formula includes factors such as frequency used, cost of funds, period and currency.

40 To ensure further security, it is still an object of this invention to incorporate a point of sale terminal to include a database use to keep track of the cards sold, the amount, the time of sale and deactivation of a particular card. The point of sale terminal can also accept payment and make payment since it has a direct credit or debit facility linked to its account in the system. Given today's sophisticated cashier machine, this is well within the elements proposed.

45 The point of sale terminal need to sent this accrued information to the host

computer 3 times a day through a modem linked up to the system to limit running cost. The host will then match off those cards that are sold and activated. This is an audit function and not authorisation process of the system. Alternatively, the simple peeling of peel-able bar-codes from the pre-paid cards at time of sale and aligning them according to a prepared table and later faxing this to the host computer is acceptable (See FIG 6).

To ensure further security, it is still an object of this invention to incorporate unique payment codes, which are issued only at the time of a purchase by the merchant. These codes are sent separately to the user/buyer and to the host computer. Once the host computer receives this code, it will store this code and wait for the prospective buyer to check into the system to input the buyer's payment code as provided by the seller. Both codes are then checked together by a unique set of algorithm to authenticate the seller and if it matches, the user can proceed to make payment using the pre-paid card or from the user's stored account and a receipt code is given.

It is also an object of this invention to be able to play audio/visual advertising material while it is processing a command request. The host computer will store all inputted data and maintain a database for all actions taken during the process and those instructed by the users, for example making a payment to a certain company, recording the transaction, time, amount and replying back to the user with a receipt number. This step is important in the event of a dispute so that each step can be traced to provide evidence. For the Internet user where it is permitted, we will be using a screen-capturing feature, which records all the screens shots shown at the user's monitor.

In accordance with the preferred embodiment of this invention, an audit trail for a pre-paid card transaction is created by storing security code of the pre-paid card and providing a transaction identification tag to link the security code of the pre-paid card at each transaction.

In accordance with another object of the invention, the method and apparatus provide for the wire transfer of funds to a transferee over this network. In order to carry out the wire transfer, the user enters his own account number and password and the account number of the person who is to receive the wire transfer. Preferably, a receipt code is issued to the user. In the preferred embodiment of the invention, the actual payment for the wire can be seen as a mere book transfer between two accounts, that is debiting the user and crediting the recipient's account and once this is completed, the user will be given a receipt number by the host computer and the host computer will dial the recipient's telephone number (if any) to inform the recipient of 'new developments' in his/her account. Alternatively, an email can be sent. The latter is optional and of course a fee will be charged for this service.

In accordance with still further embodiment of the invention, the pre-paid cards and apparatus allow the payment of invoices or bills owed by the user after having been qualified as a user by registering into the system.

Brief Description of the Drawings

FIG. 1 illustrates the circuit design linking to a public switch telephone network in accordance with the pre-paid card and service of the present invention.

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FIG. 2 is a flowchart outlining the process of one embodiment of the initialisation process in accordance with the present invention.

FIG. 3 is a flowchart illustrating embodiment of the "payment option in local currency" in accordance with the present invention.

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FIG. 4 is a flowchart illustrating another embodiment of the "storing value in foreign currency" in accordance with the present invention.

FIG. 5 is an illustrating the pre-paid card in accordance with the present invention.

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FIG. 6 is an illustration of the table for faxing "used pre-paid cards' codes" in accordance with the present invention.

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DETAILED DESCRIPTION

With reference to the attached drawings, several embodiments of the present invention will now be described in detail.

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FIG. 1 shows an example of circuit architecture which constitutes an example of the pre-paid card system in accordance with the present invention. The system permits the user to make a telephone call to make a virtual payment without the need for the caller to have a large supply of currency or go to a bank or have a particular credit card thereby maintaining existing paid phones to be used. The party is connected to the called number through one or more nodes in a public switched telephone network (PSTN). FIG. 1 shows an interaction between an end user or party 10 with one PSTN node 20. The node 20 may comprise a telecommunications switching system located in a central office.

In addition to the network node 20, the architecture of FIG. 1 includes a platform 30 connected to the network node 20. The platform 30 may be co-located with the network node 20 or remotely located with respect to the node 20. The platform 30 contains an end office digital switching system 40 connected to the network node 20 via one or more central office trunk facilities collectively designated by reference numerical 35. For example, the switching system 40 may be connected to the central office switching system in node 20 by one or more conventional T1 trunks, ISDN channels, or analogue lines, as needed. The switching system 40 performs call processing functions for telephone calls between the platform 30 and the network node 20. The call processing functions of the switching system 40 are controlled by a host computer 60. An Automatic Decoding Unit (ADU) 45 interacts with host computer 60 to automatically decode any payment codes received. An operator 42 may also interact with the switching system 40. It is to be understood that a back-up switching system, host computer, and database may also be used to serve as redundant systems in the event of primary system failure.

The pre-paid card service platform 30 also contains an Interactive Voice Response Computer (VRC) 50 which performs voice response functions related to user account verification, pre-paid card authentication and activation and payment etc. The VRC 50 communicates with the caller to by providing a menu prompt system and assist the caller in reaching the desired functions. In cases where it is difficult to input the alphabets, voice recognition technology will be employed. As this technology is still being nurtured, we are hopeful eventually, this technology will replace the VRC 50 completely. The VRC 50 is connected to the switching system 40 through appropriate communication lines.

The architecture of FIG. 1 also contains a service management computer 80 which manages the entire card database 85 containing relevant information

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- about each outstanding card such as the current balance for each card, the user's accounts, advertising files and trail codes for each transactions. This is where all the information for this system is kept and linked to the host computer. In addition to managing the card database 85, the service management computer 80 also performs operations, administration, and maintenance (OA&M) operations for the platform 30. The service management computer 80 also provides a gateway for remote access to the pre-paid service platform 30 including Internet Access 15 for payment through the World Wide Web.
- 10 It is to be understood that redundant systems may also be used to back-up each of the aforementioned elements of FIG. 1.

With reference to FIG. 2, the following description of an initialisation flow represents the caller's interaction with the pre-paid service. At step 100, the caller enters a network access telephone number, such as 1-800-PAY-123. The system checks for number or IP integrity it is being called through a data gateway which could have originated from the Internet. If this is verifiable then it will provide a menu at step 150. In this FIG 2, it is shown the sequence for accepting a pre-paid card. At step 160, the system prompts the caller to enter some form of activation code. If this is verifiable, it will ask for the security code at step 190. If this is verifiable, it will then announced the card balance at step 220 which will be followed by some advertisement at step 230 and finally at the main menu at step 240. The whole process should no take more than 4 minutes and all steps are timed.

25 In FIG. 3 at step 250, the user is prompted for the payment code. Each payment code sent to the customer/user is unique and is linked to the customer's name or address or whatever data that was inputted earlier by the customer. At step 260, on inputting this payment code, the Automatic Decoding Unit (ADU) 45 interacts with host computer 60 to automatically decode any payment codes received. First it will combine the code with the merchant's code which was sent to the platform 30 at the same time. It will then run a complex decryption process to ascertain the authority of the codes. Both codes will reveal, the payment status including amount and delivery mode. It will check to see if the customer's payment code refers to any of its existing customers in the database. If it is not, it will prompt the user to enter the pre-paid card as per in FIG 2. If the user is an existing customer in the database, then host computer 60 will do a further check to see if there is sufficient funds to complete the payment process. If there is insufficient, host computer 60 will prompt the user to enter the code for the pre-paid card as per FIG 2. It is envisaged that some users may wish to make partial payment such as for electricity and necessity where such authority has been given. Such is permitted. In any event, in step 260, advertising information will be played while waiting for a response. At step 270, the user is prompted to enter the amount he wishes to pay which may be the full amount or

less. At step 280, the amount is accepted and a receipt code is announced for audit and verification.

In FIG 4, the menu include not only payment but also storage of the value in a different currency for later use. At step 300, it asks for the duration to store the amount. This duration is flexible and allows the longest time to store in the system. The downside is that the longer it is, the higher is the storage cost for the user. At step 310 by default, the system asks whether the user wants to store in a different currency. It then presents a number of available currencies at step 320. After user input the desired currency, at step 330, advertising information will be played while the amount is being calculated including the duration to be stored. It then presents the value/result to the user and asks whether it can be accepted at step 340. If the user decided not to accept as in FIG 4, then user need to press 2 to reject on the phone. This brings up a different step 350, which by default brings the option back into local currency. Again taking the former value of 1 year, the system calculates again and presents the value for local currency at step 370 and ask for whether to store in ones account or transfer to another. While waiting step 360 plays product advertisement.

FIG 5 shows the pre-paid card, which has one unique feature, which is the peel-able bar codes one for the seller, and one for the client. As mentioned this invention is designed to operate at minimum cost but with the same level of security found in more expensive system. The peel-able feature is used together with FIG 6 to submit to the host computer, as a double check of the cards, which are being circulating in the market. It helps in tracking these cards and in the event of a card being stolen, it can be traced quite easily given these records where one remembers the date/time of purchase and the seller's shop or by presenting the other bar-code which is usually kept separately by the user. Otherwise, the features found in this pre-paid card is similar to existing cards.

In FIG 6, shows the special form where the peel-able codes are pasted at the time of sale. As mentioned previously while sophisticated cashier machines can read the bar code and record the sale, such information is still require to be updated at the main system. Such updating can be done by direct computer to computer upload which requires modem communication and some computing skills as well. Alternatively, using the special design form adapted here, the seller which is a typical store owner can easily sent this as a fax to the computer. At the receiving end, the fax is being feed in directly by digitising the information. Depending on where the peel-able codes are placed on the sheet, the computer can determine the time and identity of the card as well as the shop that sold it. All this information is then check against the database. By using this process, we will be able to target smaller shops as well and increase the usefulness of this system at lower cost.

It should be noted above that the Figures shown here are based on the Interactive Voice Response Computer (VRC) 50 interacting with the user over a telephone. As for the Internet framework, a similar interactive process based on the above but using text and voice is used.

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The two main distinguishable features of this system is the stored value calculation for local and foreign payment process and the security impact which reverses the role of providing codes from customer to merchant.

- 10 As the case maybe, the calculation of the stored value may be determined by multiplying a base price B by these factors. The variables used to calculate the stored value from the base be continuously or discretely variable. One set of discretely varied variables is described in the table below. There are according to this invention many ways of calculating the value and as such these methods are only for demonstration purposes. In my final product, a combination of a few of the methods will be applied. In the final analysis, those most responsive will be adopted and refine while those which are not will be abandon.

20	D	A factor relating to the number of years before expiry of pre-paid card. In this example D decreases as the number of years increases	
	1 year	1.0	
	2 years	0.98	
	3 years	0.95	
25	4 years	0.93	
	5 years	0.90	

- 30 L A factor related to the value and loyalty of customer that is based on his/her past purchases of pre-paid cards.

High Demand with purchases over \$1500 a month	1.1
Medium with purchase over \$500 a month	1.0
Low demand with purchase less than \$499 a month	0.97

35

C A factor relating to the cost of money. (Current interest rate less 100) so if the current local preferred currency's interest rate is 5 percent per annum, then the value is 0.95 or whatever equivalent to the foreign currency's interest rate if foreign currency is requested which if it is Australia Dollar is also 5 percent.

40

R A factor related to the flexibility of the customer's purchase plans, that is he/she intends to buy local goods in local currency or might use it for International purchase such as using another currency.

Flexible (ie wish to purchase goods in any currencies) This factor is linked to the daily exchange rate of a particular selected currency, in this example, we will use the Australia Dollars at 1.42. The host computer will prompt the user to the currency the user desire.

5

Not Flexible (ie wish to purchase goods in local currency only)	1.0
Otherwise the exchange rate of the desired currency	1.42

10

Using these variables, a suitable algorithm for calculating an appropriate value is as follows:

Stored value = $B * D * L * C * R$

15

For example: A one year pre-paid card with face value B of \$100 (US Dollars) will have a stored value of $100 * 1.0 * 1.1 * 0.95 * 1.42 = \148.39 (Australian Dollars) for 12 months.

More sophisticated formula may be used to arrive at a suitable stored value.

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The example above, assume a customer wants to purchase a \$100 pre-paid card. Further assume that he expects to use it within 1 year from now (D) 1.0, he is an excellent card user (L) of 1.1 (This is determine by the computer by checking his purchase and transaction records stored in its database), Interest rate (C) 0.95 is quoted for Australian Dollars, he wants it to be in Australian Dollars (R)

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1.42.

The encryption/decryption for payment codes and vendor identification.

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There are according to this invention many ways of performing these process. For example, each vendor is assigned a unique vendor number that is known only to the host computer. For example in this case, let us assume the vendor's number is 1234567878907. Now at the vendor's computer it will generate a payment code to the host computer and to the buyer. The buyer need to use this code to finalise the purchase. The host computer in this case will add up both numbers generated by the vendor's computer and the answer must be equal to 1234567878907 or with the format $X + Y$ (X and Y being the unknowns and generated by vendor computer) must be equal to 1234567878907. In this context, the arguments take the shape of addition with two generated variables only. There can be many variables or sub-variables in the verification formula.

40

The vendor's computer is running a program that generates codes which only the host computer can recognise.

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Industrial Application

5 This system according to the invention possesses several advantages over existing arrangements in reducing the cost of transactions and provides a service where there are no banking facilities. It also provides for a way where audio advertisement may be heard while the transaction is being processed through the telephone. Such service may be interactive as well depending on the client's requirements.

10 Furthermore it functions as a cost efficient currency converter and a reliable form of payment in addition to those currently used such as credit/debit cards which can be used for Internet purchasing. Moreover, this structure is less administratively consuming since the point-of-sale is managed by a self
15 employed person such as those found at grocery stores where this service forms part of his service to regular clients contrasting with a traditional bank where, its main business is to deal with money only. Most of the interaction/services are performed by the users themselves with the host computer as its guide and executioner. As this is an interactive system, the users will always have control and can determine when they want to initiate a transaction, how much to take
20 and when to stop. There will be some form of security and safety control within the system design to prevent abuse or cracking of the host system.

25 This invention is designed to be scaleable and without much mechanical moving parts will be robust.

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Claims

While the present invention has been described above in terms of specific embodiments, it is to be understood that the invention is not limited to the disclosed embodiments. On the contrary, the present invention is intended for various modifications and equivalent structures included within the spirit and scope of the appended claims.

I, the inventor claims:

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1. A method to enable customers/purchasers to obtain fixed amount of stored monetary value in local currency in pre-paid cards from a plurality of point-of-sale locations and to use these pre-paid cards to conduct bill payments activities for both local and international transactions in their respective currencies through a payment service network using tone telephone connectable to a call processor such as Interactive Voice Response Systems located at a remote host computer, the method comprising:

15

a call processor coupled to the database of pre-paid card accounts, user accounts including service provider accounts and to the telephone network, the call processor receiving, from a telephone, access information used to identify the particular pre-paid card account and user account to establish a payment transaction using the telephone network, the call processor further reduce the amount associated with the particular pre-paid card account in correspondence with the payment transaction requested and authorised by the user,

20

each user or purchaser of these pre-paid cards may have an pre-assigned numbered account in the database with the host computer and security check such as password is required to access this accounts for operation purposes,

25

each pre-paid card shall have an activation code associated and a security code which is hidden under scratch-through material on the card where both codes are transmitted by way of a telephone tone signal following a series of manual operation as dictated by the call processor through the telephone or through a keyboard by way of the Internet so that these codes can be checked and verified against the unique pre-paid card account stored at the host computer

30

upon activation, each pre-paid card account will be assigned a transaction number for audit trial purposes with a different transaction number assigned for every transaction until the monetary amount stored in the pre-paid card is exhausted or upon termination by redemption for value

35

receiving access information such as the user's account and password and the pre-paid card's code and password inputted from a tone-telephone to a call processor having access to the database of pre-paid card accounts and user's

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account, the call processor using the access information to establish a particular one of the card accounts and to establish an electronic transaction from the telephone using the telephone network;

5

debiting the authorised monetary amount associated with the user's account of one or more pre-paid card accounts in the user's account in accordance with the payment code/transaction that the user has provided on payment network through the telephone subject to authentication of the payment code by the host computer,

10

crediting the authorised amount as requested by the user after the user has provided the payment transaction code to the call processor having access to the database of the user's account, the vendor's account and the pre-paid card accounts from the telephone using the telephone network subject to authentication of the payment code by the host computer

15

a call processor coupled to the database of pre-paid card accounts, user accounts and to the telephone network, the call processor receiving, from a telephone, access information used to identify the particular pre-paid card account and user account to establish a currency conversion transaction using the telephone network, the call processor further convert the amount associated with the particular pre-paid card account in corresponding with request by the user.

20

reducing the pre-paid authorisation converted amount associated with the particular pre-paid card account in correspondence with the various transactions made in the network by crediting the corresponding service provider's or any account as requested by user;

25

the generation of special code known as the payment/transaction code by the seller to identify the buying party making the payment through an email (bare or encrypted) or by any means communicated such as an invoice to a physical address of the paying party. At the same time another different code will be sent to the host computer to authenticate the vendor by means or a bare or encrypted email. Both codes are required for payment purposes and the host computer will decrypt, authenticate and cross match both codes with a security algorithm to match the account to be credited to avoid false and invalid transactions.

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2. A computer system for creating and managing pre-paid cards accounts and user accounts used to access a payment network using a telephone, the system comprising:

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a database of pre-paid cards accounts and user accounts including service providers accounts located at a location remote;

- 5 a call processing unit coupled to the database of pre-paid card accounts and users accounts, the call processing unit activating the particular pre-paid card account in the database of pre-paid card accounts in response to receipt of the activation information by purchaser with the particular pre-paid card account through the telephone;
- 10 a call processing unit coupled to the database of pre-paid card accounts and users accounts, the call processing unit calculating the "store rate" particular pre-paid card account in the database of pre-paid card accounts in response to receipt of depositing action by user of the particular pre-paid card account;
- 15 the stored rate is formulated to be $B \cdot D \cdot L \cdot C \cdot R = K$, where B is the face value of the pre-paid card. D is a factor relating to the number of years before expiry of pre-paid card. L is a factor related to the value and loyalty of customer that is based on his/her past purchases of pre-paid cards. C is a factor relating to the cost of money for a particular selected currency. R is a factor related to the exchange rate that is 0.98 to buy local goods in local currency or as the case may be the currency rate for an international purchase in another currency. K is the value of the stored amount in the account of the user as calculated above.
- 20 the minimum security form algorithm where $X + Y = Z$ where Z is the numbered identity of the vendor and X is the transaction code to be sent to the payer and Y is the transaction code to be sent to the host computer. The host computer will wait for X to be sent from the buyer/payer by telephone to finalise the payment procedure.
- 25 3. A system for enabling customers to obtain pre-paid card and user accounts from a plurality of point-of-sale locations and to use both the user accounts and pre-paid card accounts to access a payment network using a telephone, the method comprising:
- 30 a database of pre-paid card accounts and user accounts located at a location remote from the point-of-sale locations;
- 35 means wherein the real-time data transmission between the customer through said host computer proceeds through telephone lines
- 40 means for storing a group of announcements or instructions including advertisement;
- 45 means to play audible product information files to the user when waiting for a requested transaction to be completed

means for receiving at least one signal from the pre-paid user to verify the user's pre-paid card account in response to an announcement or voice instructions sent to the user through the telephone;

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means for receiving at least one signal from the user to verify the user's account in response to an announcement or instruction sent to the user through the telephone;

- 10 means for verifying the validity of the user's account number if the user is an exiting user otherwise will ask the user to set up an account as an alternative option;

- 15 means to ensure there is no conflict between an user account with another users' account

- 20 means for determining if there is a predetermined amount of available funds associated with the account number for automatic deductions for regular pre-arranged services such as water, electricity, gas etc as an optional arrangement between user and service provider and where there is sufficient funds, a payment transaction will be executed;

- 25 means for receiving and analysing a payment code or other transaction codes from the pre-paid user and vendor through the telephone or computer network as the case maybe as an alternative option;

means to convert and stored the authorised amount from the pre-paid card into any currency of choice by the user in the user's account

- 30 means for determining if there is sufficient funds available in the use's account for a transaction of choice and if there is insufficient will ask user to promptly apply another pre-paid card to continue otherwise will terminate the transaction together with an error message to the vendor for notice;

- 35 means for completing a payment transaction from the pre-paid account if there is sufficient available funds;

- 40 means to decrypt and verifying a payment code to identify the vendor , the payment amount and the buyer's account where the buyer has elected this as their payment option.

- 45 means for transferring activation and security information associated with a particular pre-paid card account to the remote host computer by telephone by user, the activation and security information being used to identify the particular pre-paid card account, the particular pre-paid card account being associated with

a distributor of the particular pre-paid card account;

means for activating the particular pre-paid card in the database of pre-paid card accounts in response to receipt of the activation and security information;

5

means for receiving access information transferred from a telephone and for identifying the particular pre-paid card account and user's account using the access information,

10

means for setting a time sequence or the number of attempts when activation and security information or password and account number input sequence is being run for both pre-paid card and user accounts respectively;

15

means for disconnecting the telephone call when the time sequence runs out or number of attempts exceeded because of wrong inputs;

means for establishing a payment transaction from the telephone to a desired vendor or service provider using the telephone network,

20

means for transferring the active authorisation monetary amount associated with the particular pre-paid card account or the monetary stored amount in the user's account as the case may be in correspondence with the amount requested by the user or the transacted amount as billed by the payment code, and for terminating access to the payment network when the transaction is completed as well as issuing a code receipt number as reference before termination,

25

means to transfer the stored monetary amount in the pre-paid card or user account to another user account as a payment transaction,

30

means to generate and encrypt payment codes for verification for payment transaction by vendors in the payment network

means for the host computer to identify the call phone's physical address or location and alert appropriate authorities.

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means for preventing unauthorised access to the host computer

means for new services to be created and changed on-line by the operator

40

means for a real-time resource consumption indicator for real-time billing for products and services provided.

means for the host computer server to serve a plurality of users simultaneously

means to access gateway to the internet and provide all the means above in the form of a world wide web interface.

3. A computerised system or program of claim 2 at the remote host computer
5 use to facilitating the activation of pre-paid cards and to track usage of the pre-paid cards, to perform book entries for transaction requested, to create trial codes, to decrypt, verify payment codes and issue receipt codes, the computerised system or program comprising:

10 a backup computer for the host computer,

a database storing information associated with a plurality encrypt or otherwise, pre-paid cards accounts, user accounts, activation codes, security codes, vendors codes, transaction entries/codes, product information audio files, algorithms to
15 decrypt, verify all the above codes and linking these codes to their respective owners and amounts, formulae to calculate "stored value" including their variables, foreign exchange rates, interest rates associated with the varies currencies, able to perform addition, multiplication, division and minus operations within the accounts when required;

20 a host computer coupled to the database and having a port connected to a telephone network, the host computer receiving activation and security information associated with a particular pre-paid card via the telephone network, the activation and security information being used to identify the
25 particular pre-paid card and its stored amount, the particular pre-paid card being associated with a distributor of the particular pre-paid monetary card, the host computer activating the particular pre-paid card in the database in response to receipt of the activation and security information by associating an active call authorisation amount with the particular pre-paid card;

30 a host computer coupled to the database and having a port connected to a telephone network, the host computer receiving security information associated with a particular user via the telephone network, the security information being used to identify the particular user and its account's stored amount: and

35 a call processor coupled to the database and to the telephone network to receive access information transferred from a telephone, the access information being used by the call processor to identify the particular pre-paid card access followed by the particular user and to establish a requested transaction from the
40 telephone to pay a vendor by inputting a set of payment code numbers, upon verification of the payment codes the host computer transferring the authorised amount associated with the particular pre-paid card or user's account as the case maybe in correspondence with the amount ascribed in the payment transaction to the vendor's account and terminating call.

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a call processor coupled to the database and to the telephone network to receive access information transferred from a telephone, the access information being used by the call processor to identify the pre-paid card, particular user and to establish a "stored value" transaction in either local or foreign currency denomination from the telephone and transferring the 'stored value' into an account which requires the payee's account number which may include the owner of the pre-paid card, the host computer transferring the authorised amount associated with the particular pre-paid card into the account and halting communication at the end.

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4. An interactive voice response system of claim 1 that allows a user to conduct bill payment, by telephone, comprising:

15

a host computer maintaining accounts for the user, transaction accounts and pre-paid cards accounts;

responding with voice menu selection to a pre-paid user over the telephone regarding instructions about how to make a pre-paid payment;

20

voice menu means, responsive to user inputs, for providing the user a voice menu of a plurality of available transaction options;

25

menu selection means for allowing the user to select a menu of one or more of said available transaction options by entering at least a numeric number corresponding to one or more of said available transaction options; and

30

means for allowing the user to select any of one or more said available transaction options presented in the voice menu by providing an input into the system;

35

completing the payment transaction from the pre-paid user in response to prompts made by the announcements.

means for prompting the user to enter the activation information if the user has a pre-paid card;

means for collecting the activation information;

40

means for identifying the pre-paid card account based on the activation information and means for prompting the user to enter the security information,

means for collecting the security information code, and means for verifying the security information code is correct for the particular pre-paid card.

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means for prompting the user to enter a user identifier if the user has an account;

means for collecting the user identifier;

- 5 means for identifying the user based on the user identifier and means for prompting the user to enter a personal identification code,

means for collecting the personal identification code, and means for verifying the personal identification code is correct for the user.

- 10 means determining whether the user is a new user, means for prompting new users to select a unique personal identification code and means for allowing users that are not new users to bypass the means for prompting new users to select a unique personal identification code.
- 15 means for allowing the user to receive audio information concerning the user's account and the pre-paid card, including account balance information and fund transfer information or advertising audio files during or between prompts or inactivity by the host computer via the telephone receiver;
- 20 means for providing voice prompt that supply audio information to the user, and request data from the user; said means for providing voice prompts including means for providing voice prompts that present the user with a sequential listing of available transaction options;
- 25 means for allowing the user to select any of the plurality of available transaction options by providing an input into the system in response to one of said voice prompts; the user to select any of one or more available transaction options includes means for prompting the user to press a particular key of a telephone;
- 30 wherein one of the available transaction options is bill payment and the system further includes means for allowing the user to select a payee, the means for allowing the user to select a payee by way of providing an input such as a transaction/payment code if it is a bill payment or the payee's account number for a straight transfer through the telephone.
- 35 wherein one of the available transaction options is bill payment in a foreign currency and the system further includes means for allowing the user to select a currency, the means for allowing the user to select a particular currency by providing an input into the system in response to one of the said voice prompts
- 40 that represent the currency from a list of currencies through the telephone,
- means for user to either agree or reject the transaction in progress in response to one of the said sequential voice prompts or reject/end by hanging up.

5. The interactive voice response system of claim 1, further comprising means for connecting the user to the advertiser's call centre in response to a voice prompt input when an advertisement or announcement is played during processing information.

5

6. The interactive voice response system of claim 1, further comprising means for allowing the user to select or change said personal identification code and means for confirming that said personal identification code is not the same as other user identification codes.

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7. The interactive voice response system of claim 1, further comprising means for allowing the user to select or change said personal identification code and means for confirming that a new personal identification code is not the same as other personal identification codes.

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8. An interactive voice response system according to claim 1, wherein said means for providing voice prompts includes a voice processing system that generates voice messages and processes user input.

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9. An interactive voice response system according to claim 1, wherein said means for allowing the user to select any of one or more said available transaction options includes a voice processing system that generates voice messages and processes user input from a telephone for user input.

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Abstract of the Disclosure.

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This is a pre-paid card system used to store monetary value and subsequently for making payment to merchants through the telephone system or through a data network. Unlike static credit card numbers, this invention employs the generation of encrypted dynamic codes for each transaction, which must be

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verified within a specific time, for payment initiation. Codes are send by merchant when a purchase is agreed upon and each codes have a time limit to be used. Customers need to accept this codes and present them to the host

computer to complete the payment process. Codes from both merchant and customer are decrypted at the host computer to produce the authenticated

15

instructions for the payment. This invention also employs a unique formula to calculate stored value including in foreign currencies.

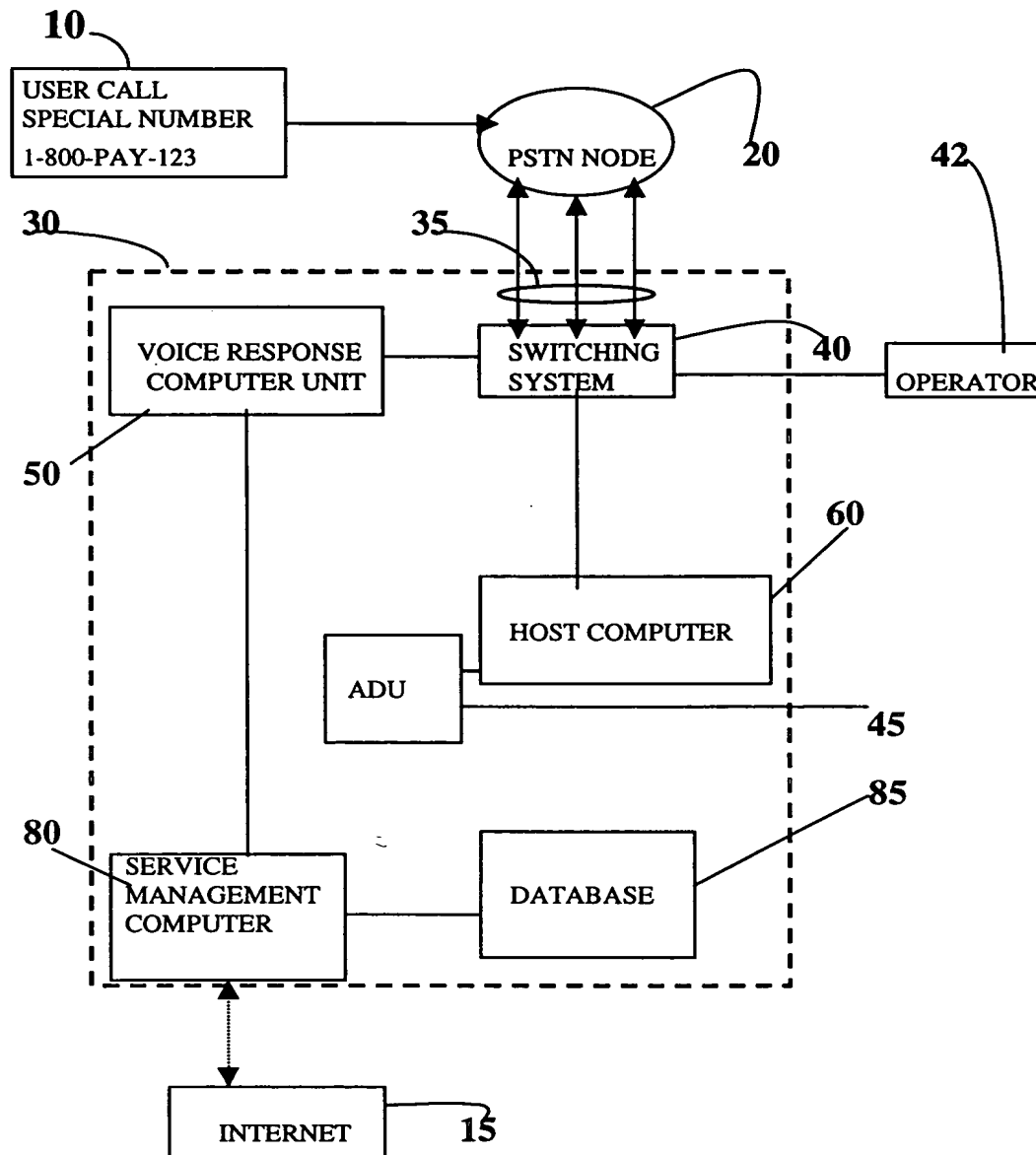


FIG 1

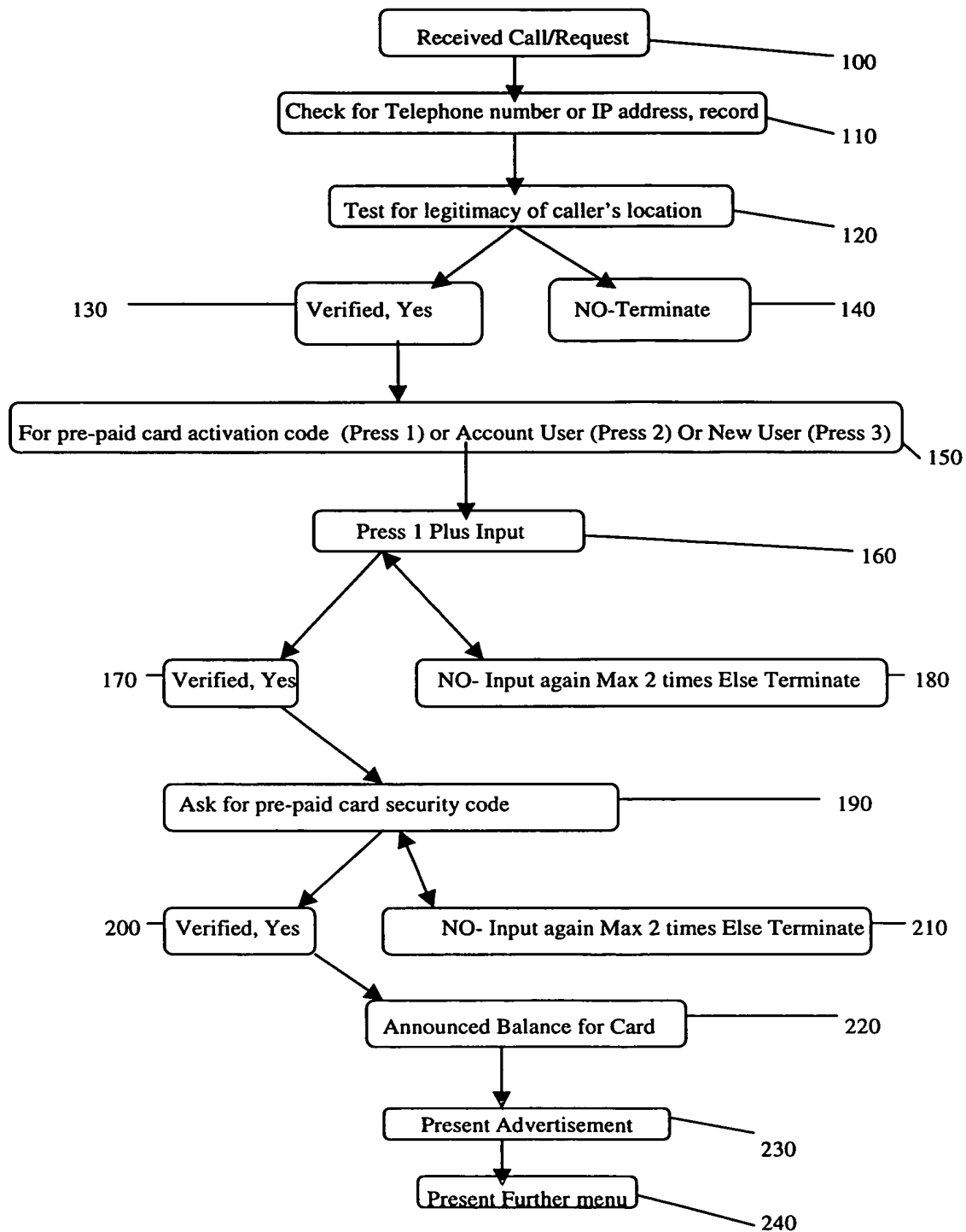


FIG 2

"Make Payment in Local Currency" Example

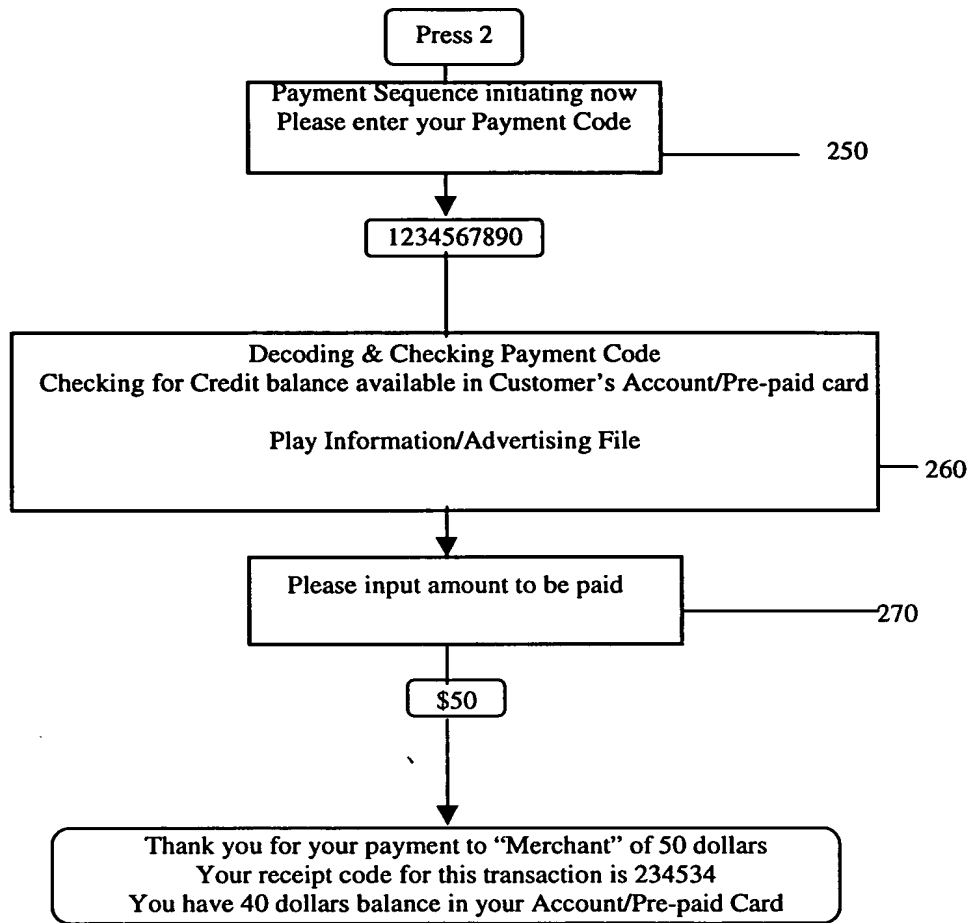


FIG 3

"Storing Value in another currency" Procedure

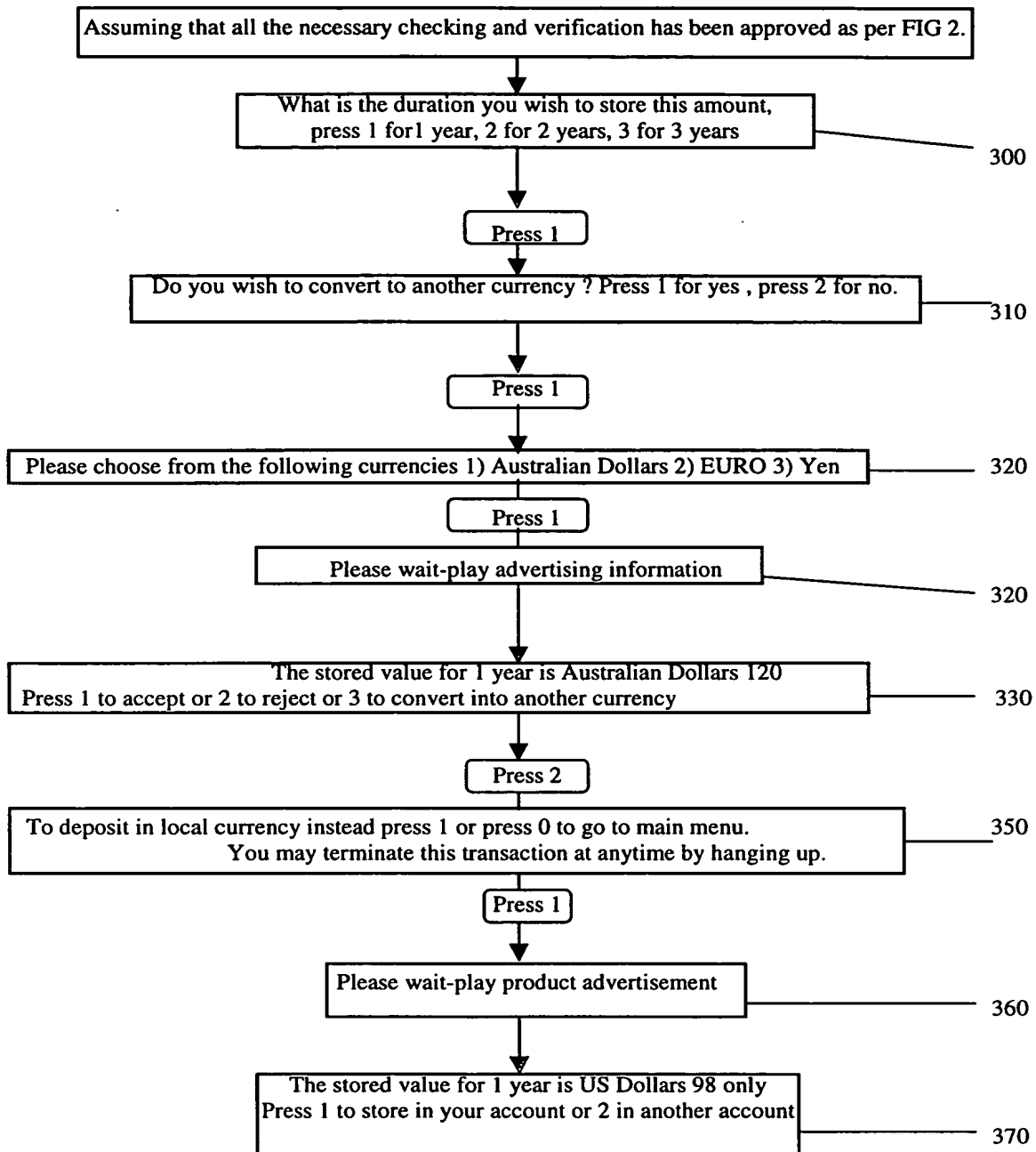
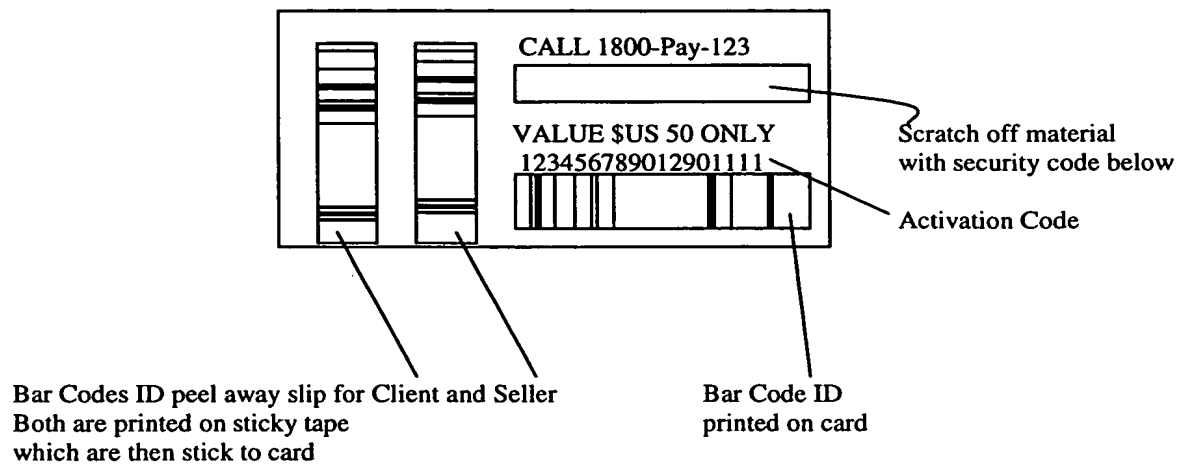


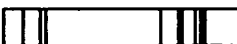



FIG 4

**FIG 5**

Daily fax sheet to host computer

DATE: 13 June 1999 SHOP			
VALUE 50		VALUE 100	
TIME 6-7			
TIME 7-8			
TIME 8-9			
TIME 9-10			
TIME 10-11			
TIME 11-12			
TIME 12-13			
TIME 13-14			
TIME 14-15			
TIME 15-16			
TIME 16-17			
TIME 17-20			
TIME 20-24			

bar codes for Shop seller

bar-codes from pre-paid cards sold

FIG 6